EFFECT OF AGE OF CASTRATION ON GROWTH PERFORMANCE AND BODY CONDITION SCORE OF RED SOKOTO GOATS IN KASHERE, GOMBE STATE, NIGERIA

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ABSTRACT

The experiment was carried out on twenty (20) male Red SokotoGoat kids of 8.64 ± 0.19kgkg initial body weight for five (5) months to investigate the effect of age of castration on live weight gain and body condition score. The treatments were (T0) uncastrated red Sokoto goat kids at 2 months of age (T1), castrated at two months (T2), castrated at three months (T3), castrated at four months (T4) and castrated at five months. Treatment All castrated and intact goats were allowed to graze on Federal University of Kashere Teaching and Research farm from March-July, 2021. Treatment four had significantly higher ($p<0.05$) live weight than the other treatments. Low live weight gain ($p>0.05$) was observed in treatment one in the month of March, 2021. Body condition score of experimental goats was significantly higher ($p<0.05$) in treatment four, than any other treatment. Body condition score was significantly higher ($p<0.05$) in treatment four from April-July, 2021. Low body condition score ($p>0.05$) was recorded in the month of March in most of the treatments as a result of pains of castration and adaptation period of the goats to the effect of castration. These effect leads to slow grazing, rough hair coat which gave the goats an appearance of malnutrition it was concluded that castration at 5 months of age produced the best growth and body condition score

Key Words: Castration, Growth, Performance, Body Condition Score, Red Sokoto Goats

INTRODUCTION

The Nigerian human population is estimated at about 209,477,313million (NPC, 2021), this population is continuously on the increase annually. This increase has led to more demand for animal and animal products to meet up with the minimum animal protein requirement per individual per day. The protein intake of an average Nigerian is estimated at 45.5g per head per day, this is lower compared with the Food and Agricultural Organization's recommended minimum intake of 70g per head per day, of which 50% (35g) should be of animal source (FAOSTAT, 2008). The inadequate supply of animal protein in Nigeria can be attributed to inadequate production potentials of the most common sources of meat which include poultry, goat, cattle, pig, sheep, rabbit etc (FAOSTAT2011).

Thus, there is therefore, the need to increase the supply of animal protein through meat consumption and this could be accomplished through efficient use of promising indigenous animals.

Castration is one of the management activities practiced in different parts of the country as castration in goats has an advantage of eliminating the strong male odor present in bucks. Un-castrated and sexually mature goats are difficult to sell or they may have low market price because of their strong male taint. Castrations also affect growth and carcass composition (Solomon *et al.,* 1991). Castrating yearling male goat can reduce their growth capability dressing percentages (Demisse *et al.,* 1988). Castration of food animals is a common management practice that imposes unnecessary pain and stress and may reduce performance (Hopkins-Shoemaker *et al.,* 2004). Intact males have relatively greater muscle in the neck and forequarter than females or castrates. Castration also affects growth and live weight gain (Solomon *et al*., 1991). Some Ethiopian farmers usually castrate their goats after maturity and fatten them for sale at premium holiday markets or to butchers or restaurants. However, castration at a younger age is rarely practiced, which may become necessary when superior bucks are being used for breed improvement programs since it may be more convenient for smallholders to castrate young bucks not required for breeding than to keep them from the does until they are sold. Early castration has much greater effect on growth and live weight gain especially on marbling degree. Castration of male kids not required for breeding should preferably be castrated at early ages, both to get good growth and live weight gain and to prevent unwanted mating (Salako, 2004). However, since the action and level of androgen differ at different ages it may produce different outcomes.

Body condition scoring is an important management practice used by producers as a tool to help optimize production, evaluate health, and assess nutritional status. This practice helps evaluate their herd or flock as to the amount of body reserves, particularly fat and muscle that an animal possesses. (Okpeku, 2011) If body condition scoring is conducted at planned intervals throughout the production cycle, nutrition and management can be altered if needed. The most critical times to body condition score animals during the production cycle include pre-breeding, mid-gestation, parturition, and weaning. The practice of body condition scoring is used mainly to increase economic returns through increased reproductive performance and realize more efficient feed costs. Body condition scoring is often done by careful visual examination, although palpation of the animal may be necessary when long hair or wool is present. Evaluations look at the amount of muscle and fat cover in eight important anatomical points when assigning a body condition score.

Once the score is determined, it can be compared to a desired condition score at a particular period of the production cycle for a species (Okpeku *et al*., 2011). At this time, a producer determines the appropriate nutritional changes or management needed.

Body condition scoring is a subjective practice, but it is usually quite accurate when performed by trained evaluators. Cattle and horses use a system of 1 to 9, while dairy, swine, and sheep are scored from 1 to 5. For all species, the lower the number, the thinner the animal. Sheep are often assigned half numbers, for example, 2.5 or 3.5; dairy are often assigned in fourths, for example, 2.75 or 3.25 (Okpeku, 2011)

Therefore, the present study was designed to test the effect of castration at different ages on growth and live weight gain of Red Sokoto Goat as well as on the body condition score.

MATERIALS AND METHODS

The field experiment was conducted at the Teaching and Research Farm of Federal University of Kashere in Akko L.G.A of Gombe state, Nigeria. It is located at an elevation of 431metres above sea level. Its coordinates lie between latitude $9^{o.}$ 55 N and longitude 11^{0} E, on the Northern fringes of the Northern Guinea Savanna belt of Nigeria. The climate is described as tropical continental climate. The temperature is high all year round with a mean annual temperature of 30^{o}C. The highest temperature is recorded during the dry hot months of March, April and May with maximum temperature above 37^{o}C. During the rainy season, the temperature drops considerably due to the cloud cover between July and August as well as during the Harmattan periods of November to February. The area records about three to four months of rainfall and is concentrated in the months of July, August and September with the average annual rainfall of 951mm per annum.The geology of the study area is developed on basement complex rocks with adjoining sedimentary rocks formation (National Geospatial Intelligence Agency, 2012).

The experimental animals used were purchased from Kashere market. Twenty (20) *Red Sokoto Goats* were purchased, which were within the ages of 2 to 5 months.

The experimental animals were introduced to the university farm, and were allowed to acclimatize for two weeks before the experiment was carried out. They were maintained in quarantine for a few weeks and the kids were treated for external and internal parasites with acaricides and albendazole respectively.

The *Red Sokoto Goats* used for the experiment, were castrated with the use of a burdizzo plier. Castration was carried out in the morning, between 7:00am to 8:00am by a Veterinarian in the university farm. A burdizzoplier was used to crush the spermatic cord of the animals. The spermatic cord was crushed twice on the left and right side of the scrotum.

The twenty (20) castrated male *Red Sokoto Goats* were assigned to five (5) treatments, the experimental design was a completely randomized design, with five (5) treatments, consisting of four (4) replicates. . T0 intact bucks at 2 months of age, T1 castrated at 2 months of age, T2 castrated at 3 months of age, T3 castrated at 4 months of age, T4 castrated at 5 months of age. The experiment from March 2021 to July 2021.

Bucks were managed in a semi-intensive management system in which they were allowed to browse on natural vegetation during the day time for 6 h and water was offered *adlibitum*. The goats were provided with shelter during the night. The shelter had concrete floor, corrugated iron roofing and open wall in which half of it (bottom part) is made simply to prevent animals from movingout, protect them against harsh weather, and protect them against predators and thieves.

- Measurement of live weight of the experimental animals was done on monthly basis from April to July 2021.
- Body condition scoring was done by physical palpation and visual appraisal using a scale of 1 to 5

STATISTICAL ANALYSIS

Data were analyzed using the General Linear Model (GLM) procedures of SAS (1999 - 2000) which was implemented on body weights, body condition score components data and Duncan's Multiple Range Test (DMRT) was used to compare treatment means.

RESULTS AND DISCUSSION

Table 1, shows the effect of treatment on live weight gained by Red Sokoto Goat. The result showed that treatment 4 performed better ($p<0.05$) than any of the other treatments. Treatment 4 showed a live weight gain of 18.33kg, better in performance ($p<0.05$) compared to other treatments. The result is in agreement with that of Testaye *et al*. (2008). This could have been as a result of the animals in treatment 4 recovering most rapidly from the effect of castration, than any of the other treatments probably due to their higher age. This earlier recovery also facilitated better grazing, selection of suitable forages on the grazing land than any of the animals in other treatments.

Table1: Final Live weight gain of castrated Red Sokoto Goats from March-July, 2021

Treatments	Final Live Weight (kg)
Control	16.69[c]
Treatment 1	17.00[bc]
Treatment 2	17.20[b]
Treatment 3	17.23[b]
Treatment 4	18·33[b]
Sig	**
SLD	0.38

Means on the same column with different superscripts are significantly (P>0.05) different

The weight gain of Red Sokoto Goats castrated in different months, March- July, 2021 is presented in Table 2.Treatment 4 performed best ($p<0.05$) in the month of March. Similarly, in the months of April, May, June and July. Animals in treatment 4 ($p<0.05$) showed a better performance ($p<0.05$) compared to other treatments. Age at castration had significant effect on body weight gained. This was not in line with the findings of Solomon *et al.* (1991), which indicated that castration has no effect on live weight gained in Arsi-bale goats.

In support of this, Mahgouband- Lodge, (1998) reported that among species, sex, slaughter weight, groups, castrated male and female goats had the lowest growth rate. Hopkins and Shoe maker,(2004) also indicated that castration of young market goats reduced growth and also Murray *et al*. (2001) reported that the growth rate of intactboar and feral bucks were significantly higher than their respective castrates.

The better performance in treatment 4 could have been due to feeding and ability of the castrated animal to recover rapidly and graze efficiently on the grazing land. Goats in all treatments performed better ($p<0.05$) at 5 months of castration of age compared to other treatments. This is similar with the report of Velez *et al. (*1993) who stated that animals gain weight in raining season because the quality and quantity of forages available for animal consumption is sufficient.

Table2: Live weights of castrated Red Sokoto Goat (kg).

Months	Control	T1	T2	T3	T4	SEM
March	6.75^{ij}	6.25j	7.70^{fgh}	8.97^{cde}	10.47^{bc}	0.374
April	7.62^{fgh}	6.95^{gh}i	8.50^{def}	9.12^{cde}	11.00^{bb}	0.341
May	7.57^{fgh}	7.00^{ghi}	8.32^{efg}	9.60^{bcd}	10.95^{bb}	0.342
June	7.45^{ghi}	9.52^{bcd}	10.17^{bc}	10.30^{bc}	13.17^{aa}	0.448
July	7.75^{gh}i	10.10^{bc}	10.30^{bc}	10.45^{bc}	14.00^{aa}	0.471
SE	0.180	0.372	0.249	0.198	0.337	**
SE			0.331**			
Sig (P<0.05)			**			
P-Value	<0.0001					

Means on the same row with different superscripts are significantly (P>0.05) different

Body Condition Score: Month against Treatments

Body condition score of castrated Red Sokoto Goats are shown in Figure 1. Control treatment in the months of March to June showed a similar performance. The control treatment showed better performance (p<0.05) in the month of July. In treatment 1 body condition score was similar from March to June, 2021.

In the month of July, body condition score was better (p<0.05) than other months. Treatment 2 showed a similar body condition score from April to July, but low body condition score (p> 0.05) was recorded in the month of March. Treatment 3 showed similar condition found in treatment 2 performance was better in treatment 4 (p<0.05) in the month of April to July, 2021. Low body condition score was recorded (p>0.05) in the month of March, 2021.

There was significant (P>0.05) difference in body condition score of castrated red Sokoto goat in different months. Red Sokoto goats castrated at 5 months of age were significantly (p<0.05) better than other treatments. Red Sokoto goats in treatment 4 had good physical appearance and attractive shiny hair coats whereas intact goats were not physically attractive and had erected hair coat which gave them an appearance of under nutrition. Castrated goats have good market value as compared to intact ones. Behaviourally, castrated goats were very docile and friendly to persons managing them. Similarly, Devendra and Mc Leroy (2000) reported that castrated animals are easier to manage and showed good body condition.

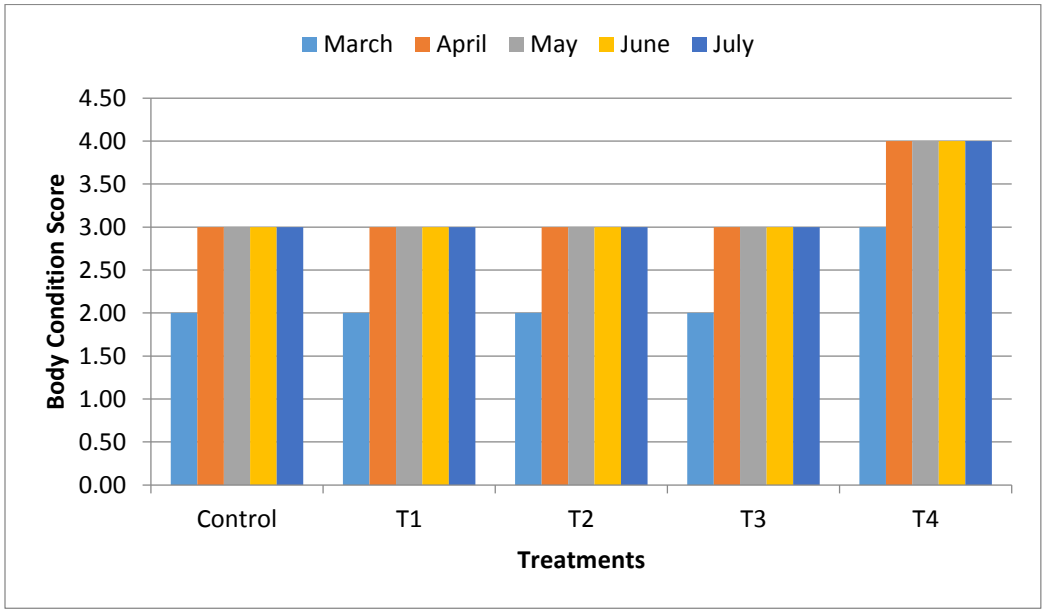

Figure 11: Body Condition Score of Castrated Red Sokoto Goat, March – July, 2022

Body Condition Score: treatment against Month

Figure 2 showed that castrated goat in treatment 1,2,3 and 4 in the month of April to July showed better performance ($p<0.05$) as compared to any other castrated goats This performance could have been due to the ability of the castrated goat to graze better, select better forages and withstand castration depression.

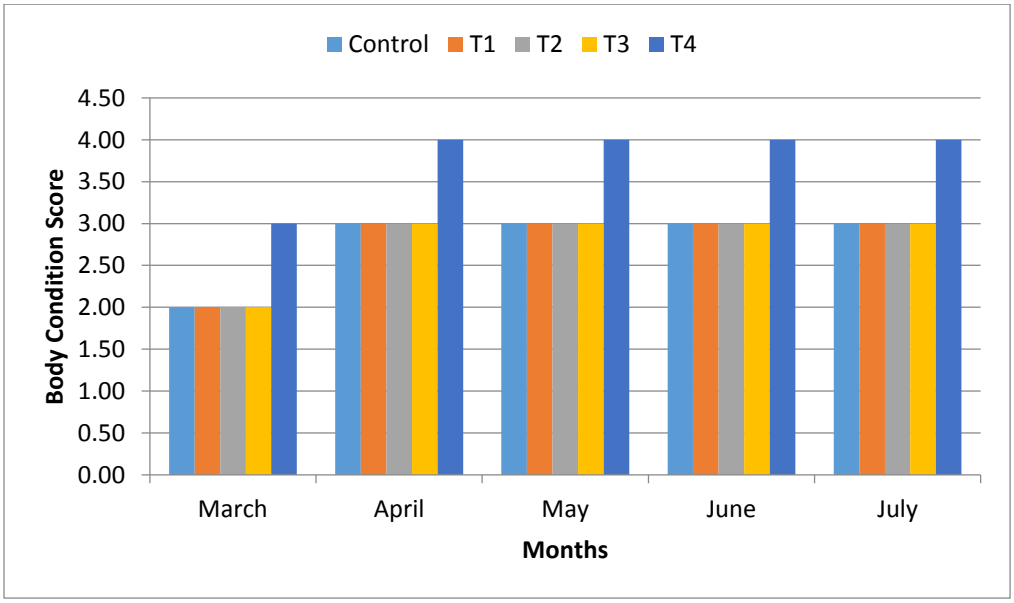

Figure 2: **Body condition score of castrated Red Sokoto Goats**

CONCLUSION AND RECOMMENDATIONS.

Conclusion

Castration or age of castration has significant effect on growth and body condition score. Castration of Red Sokoto Goats should be carried out at five (5) months of age. Low age of castration reduces performance of the animals, low level of adaptability, poor grazing behavior and low body condition score.

Recommendations.

Castration is important for better fat deposit, good carcass characteristics, better body condition score good behaviour of the animal, easy to handle and docile on the farm. If castration is required as one of the managerial tools in animal husbandry for Red Sokoto Goat, it is recommended at five (5) months of age. Research work can still be carried out on other breeds of goats to determine the appropriate age of castration for such breeds of animals.

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